AMENDMENTS TO THE CLAIMS

1. (Currently amended) A method of converting (i) solid fossil fuels , or

(ii) oil tars obtained by distillation of coal, turf, grass, rubber, sapropel, sapropelites, slates, or wood,

into biosynthetic petroleum, comprising the steps of:

a) isolating a starting microorganism capable of said conversion;

b) isolating from the starting microorganism the genes responsible for the conversion ability;

c) transfecting the genes into a host microorganism, and

d) combining the host microorganism with the solid fossil fuels or oil tars under conditions suitable for the conversion of the solid fossil fuels or oil tars into biosynthetic petroleum.

2. (Canceled)

3. (Previously presented) The method of claim 1 wherein the starting microorganism is Thiobacillus aquaesulis 4255 or 389, Thiosphaera pantotropha 356, Thiosphaera pantotropha 2944, Thoibacillus thoioparus 55, or mutants or variants thereof, or a microorganism which exists naturally in water.

4. (Currently amended) The method of claim 1 wherein, after transfection, the transfected host microorganism, as compared to the starting microorganism, is capable of faster growth, reproduction, enhanced survivability in a production environment, or more production of biosynthetic petroleum per unit of (i) a nutrient or (ii) a starting fossil fuel or oil tar.

5. (Previously presented) The method of claim 4 wherein the host microorganism can exist in salt water or fresh water, can metabolize glucose or other nutrient media, can survive

acidic or basic environments, can oxidize sulfur, or can exist in aerobic or anaerobic conditions.

6. (Previously presented) The method of claim 1 wherein the genes responsible for conversion are isolated by subtractive hybridization.

7. (Previously presented) The method of claim 6 wherein the subtractive hybridization is performed by representational difference analysis.

8. (Currently amended) The method of claim 1 wherein before transfection, the genes are selectively altered, and following transfection with such selectively altered genes, the host microorganisms with characteristics best suited to commercial production of biosynthetic petroleum are selected.

9. (Currently amended) A method of improving conversion of (i) solid fossil fuels, or

(ii) oil tars obtained by distillation of coal, turf, grass, rubber, sapropel, sapropelites, slates, or wood,

into biosynthetic petroleum, comprising the steps of:

(a) isolating a starting microorganism capable of said conversion;

(b) isolating from the starting microorganism an oligonucleotide probe complementary to a gene responsible for the conversion ability;

(c) placing the probe under hybridizing conditions in contact with amplicons from other microorganisms suspected to be capable of or being capable of said conversion;

(d) isolating amplicons which hybridized;

(e) transfecting the isolated amplicons into a host microorganism;

f) combining the host microorganism with the solid fossil fuels or oil tars under conditions suitable for the conversion of the solid fossil fuels or oil tars into biosynthetic petroleum; and

(g) determining whether productivity improved.

10. (Canceled)

11. (Currently amended) A method of converting carbon, hydrogen and oxygen into biosynthetic coal or biosynthetic petroleum, comprising the steps of:

(a) isolating a starting microorganism capable of said conversion;

(b) isolating from the starting microorganism the genes responsible for the conversion ability;

(c) transfecting the genes into a host microorganism; and

(d) combining the host microorganism with the carbon, hydrogen and oxygen under conditions suitable for the conversion of the carbon, hydrogen and oxygen into biosynthetic coal or biosynthetic petroleum.

12. (Currently amended) The method of claim 11 wherein, after transfection, the transfected host microorganism as compared to the starting microorganism is capable of faster growth, reproduction, enhanced survivability in a production environment, or more production of biosynthetic coal or biosynthetic petroleum per unit of a nutrient.

13. (Previously presented) The method of claim 11 wherein the host microorganism can exist in salt water or fresh water, can metabolize glucose, rubber, grass, or other nutrient media, can survive acidic or basic environments, can oxidize sulfur, or can exist in aerobic or anaerobic conditions.

14. (Previously presented) The method of claim 11 wherein the genes responsible for conversion are isolated by subtractive hybridization.

15. (Original) The method of claim 14 wherein the subtractive hybridization is performed by representational difference analysis.

16. (Currently amended) The method of claim 15 wherein before transfection, the genes are selectively altered, and following transfection with such selectively altered genes, the host microorganisms with characteristics best suited to commercial production of biosynthetic coal or biosynthetic petroleum are selected.

17. (New) A method of converting (i) solid fossil fuels, or

(ii) oil tars obtained by distillation of coal, turf, grass, rubber, sapropel, sapropelites, slates, or wood,

into biosynthetic petroleum, comprising the steps of:

a) obtaining a gene encoding a protein capable of said conversion;

b) transfecting the gene into a host microorganism, and

c) combining the host microorganism with the solid fossil fuels or oil tars under conditions suitable for the conversion of the solid fossil fuels or oil tars into biosynthetic petroleum.

18. (New) A method of converting carbon, hydrogen and oxygen into biosynthetic coal or synthetic petroleum, comprising the steps of:

a) obtaining a gene encoding a protein capable of said conversion;

b) transfecting the gene into a host microorganism; and

c) combining the host microorganism with the carbon, hydrogen and oxygen under conditions suitable for the conversion of the carbon, hydrogen and oxygen into biosynthetic coal or biosynthetic petroleum.